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The Industry Characteristics of Intra-Third World Trade in Manufactures*

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I. Introduction

Just as trade was seen as the engine of growth for the backward countries under colonialism, so, too, today, following several decades of inward-oriented import substitution, trade is championed as a means to increase output and employment, and thereby improve the income distribution, in the still poor countries of the world. The new trade regime, however, is to be based on the poor nations' perceived comparative advantage in relatively labor-intensive manufactures as well as in raw materials. Another difference in the new approach is the attention paid to the actual or potential trade among less developed countries (LDCs) in a variety of manufactures (south-south trade, for want of a better abbreviation). A recent survey of the major new works in development economics attests to the perceived desirability of south-south trade as a means of revamping the international division of labor and reducing the dependence of LDCs on the industrialized economies: "Frances Stewart's paper on the redirection of international trade on a 'South-South' basis is of the highest importance from several points of view, and not least, in the present context, as regards a strategy for industrial development and the related problems of the generation and transfer of suitable technologies within the Third World."¹

Reservations about the gains from south-south trade, however, have been voiced by those who are wary of the costs involved if "economic efficiency" is interpreted too broadly. Diaz-Alejandro maintains that, dollar for dollar, exports to advanced countries may do more for an

* I would like to thank G. K. Helleiner for sending me some of the basic data which I use in this paper and for giving me many helpful insights. I also received useful criticism from Duncan Foley, Sanjaya Lall, Nathaniel Leff, and Larry Westphal. Shelly Greenfield and Linda Worthman gave me valuable assistance.

¹ Arthur Ewing and Gloria-Veronica Koch, "Some Recent Literature on Development," *Journal of Modern African Studies* 15, no. 3 (September 1977): 480. The paper of Frances Stewart to which they refer is "The Direction of International Trade: Gains and Losses for the Third World," in *A World Divided: The Less Developed Countries in the International Economy*, ed. G. K. Helleiner (Cambridge: Cambridge University Press, 1976).

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LDC's balance of payments than exports to a partner within a preferential trading zone, given pressures for reciprocity within the latter. More fundamentally, he argues:

... one can doubt the economic benefits for the region of many "sophisticated" exports which now appear in the export lists of Argentina, Brazil, Colombia and Mexico. Note that a significant difference appears to exist between manufactured exports going to other Latin American countries, and those going to the rest of the world. The former tend to be more "sophisticated" but also, alas, more capital- and import-intensive. . . . The two types of exports, of course, will have different consequences for real incomes, the balance of payments, employment, etc. Much of the intra-regional "sophisticated" exports simply represent an effort to recoup the losses arising from excessive import substitution of previous years, often at the expense of trade partners. More worrisome is that some of them could also be symptoms that excesses committed by national import-substitution policies are now being repeated at the regional level. And, to make matters worse, it appears that a good share of that trade does not even benefit Latin American entrepreneurs.²

To explore one of these conjectures, Diaz-Alejandro correlated the share of total Colombian "minor" exports (1969) going to the Latin American Free Trade Association (LAFTA) with capital-labor ratios (for the United States) in 62 SITC three-digit categories. He found "a clearly significant positive link between LAFTA shares and capital intensity." At the same time, he pointed out the need for further research on these points "to clarify the extent to which some of the new exports really represent harmful trade diversion."

It is the purpose of this paper to attempt such a clarification by comparing the characteristics of the manufactures (SITC 5 through 8 minus 68) exported by 10 LDCs to developed and underdeveloped countries. The 10 exporters chosen for study are four LAFTA members (Argentina, Brazil, Colombia, and Mexico); three economies heavily engaged in exporting to the West (Hong Kong, Singapore, and the Republic of Korea); and India, Pakistan, and Thailand. The 10, however, were chosen for study more by default than design. Few other LDCs exported a sufficient value of manufactures (destined to other LDCs) to be included in the sample. Nevertheless, exports of manufactures to the north are as concentrated among a few semi-industrialized LDCs as exports of manufactures to the south. Ten LDCs account for roughly 70% of total LDC exports to other LDCs (see table 1). Seven of the same LDCs also account for roughly 70% of total LDC exports to North America, Europe, and Japan.³

² Carlos F. Diaz-Alejandro, "Some Characteristics of Recent Export Expansion in Latin America," in *The International Division of Labour: Problems and Perspectives*, ed. Herbert Giersch (Tübingen: J. C. B. Mohr for the Institut für Weltwirtschaft, 1974), pp. 222-23.

³ United Nations Conference on Trade and Development (hereafter UNCTAD),

The organization of this paper is as follows: Because of the primacy accorded to employment creation in the assessment of trade strategies,⁴ attention will first focus on the questions: Do investments in the production of manufactures exported to the advanced capitalist countries (the north) generate more employment than an equivalent value of investments devoted to producing manufactures sold to LDCs? Do exports to the north and south differ according to their skill content? Brief treatment will also be given to two other questions which are of interest in light of

TABLE 1
EXPORTS OF MANUFACTURES EXCLUDING PETROLEUM PRODUCTS AND UNWROUGHT
NONFERROUS METALS FROM SELECTED DEVELOPING COUNTRIES, 1973

Country or Territory	Exports to World (\$ Millions) (a)	Going to All Developing Countries (\$ Millions) (b)	Cumulative % of b (c)	Share b ÷ a (%) (d)
Hong Kong.....	3,578	477		13
Republic of Korea.....	2,759	308		11
Yugoslavia.....	2,303	284		12
Subtotal.....	8,640	1,069	20.4	12
Singapore.....	1,772	752		42
Brazil.....	1,643	469		29
India.....	1,440	384		27
Mexico.....	1,174	218		19
Argentina.....	951	469		49
Malaysia.....	626	211		34
Pakistan.....	595	248		42
Subtotal.....	8,201	2,751	72.9	34
Israel.....	542	108		20
Lebanon.....	361	239		66
Egypt.....	308	52		17
Philippines.....	296	69		23
Iran.....	284	56		20
Thailand.....	273	95		35
Kuwait.....	251	177		71
Morocco.....	248	61		25
Colombia.....	227	113		50
Ivory Coast.....	161	41		26
Subtotal.....	2,951	1,011	92.3	34
Other 30 developing countries....	1,072	405	...	38
Total, 50 developing countries	20,864	5,236	...	25

SOURCE.—UNCTAD, "Recent Trends and Developments in Trade in Manufactures and Semi-Manufactures," mimeographed (New York: UNCTAD, 1977), p. 13.

"Recent Trends and Developments in Trade in Manufactures and Semi-Manufactures," mimeographed (New York: UNCTAD, 1977), p. 20.

⁴ See, e.g., Anne O. Krueger, "Alternative Trade Strategies and Employment in LDCs," *American Economic Review* 68 (May 1978): 270-74.

the desirability of saving foreign exchange by utilizing local raw materials and realizing scale economies to achieve economic efficiency. Are exports to the south more natural resource-intensive than exports to the north? Are they more concentrated in industries characterized by scale economies so that their expansion could be expected to reduce unit costs? There then follows an examination of two further issues raised by Diaz-Alejandro with respect to south-south trade: Are the intraregional exports of Argentina, Brazil, Mexico, and Colombia concentrated in the types of commodities associated with the "excesses" of import substitution? And, "to make matters worse," do these exports originate more frequently in foreign-owned factories than exports to the north?

This paper makes no more than a start at understanding compositional differences in north and south trade if only because its findings are based on regressions using export figures for a single year and product data from the United States. What the findings do suggest is that capital-intensity may not be all that different in northbound and southbound exports, contrary to what is routinely supposed. When we seek an explanation for these findings, it emerges that south-south trade is also not concentrated in highly protected consumer durables. The possibilities for economic change which the manufacture of those classes of commodities which are traded among LDCs hold out, moreover, argue for a thorough reassessment of such trade—even if exports to the north were to have the edge in terms of employment creation.

II. Industry Characteristics and Export Shares

According to Diaz-Alejandro, "even without the existence of preferential trade arrangements," differences in factor proportions, and hence in employment opportunities, would be expected between the exports of Argentina, Brazil, Colombia, and Mexico to the rest of Latin America and those shipped to, say, the United States and the European Common Market. "Whatever the positive theory of trade adopted, whether Heckscher-Ohlin, Linder, product cycle, or almost any other, differences between the predicted commodity composition of trade flows will emerge."⁵ To measure whether such differences are statistically significant, U.S. data on capital-intensity and other industry characteristics were utilized because they were most readily accessible. The validity of utilizing non-country-specific data in the general case has, of course, long been debated. On the one hand, Lary, Fels, and others find little evidence of differences between developed and underdeveloped countries in factor intensities.⁶ On the

⁵ Carlos F. Diaz-Alejandro, *Foreign Trade Regimes and Economic Development* (New York: Columbia University Press for the National Bureau of Economic Research, 1976), pp. 71–72.

⁶ H. B. Lary, *Imports of Manufactures from Less Developed Countries*, Studies in Economic Relations, no. 4 (New York: Columbia University Press for the National Bureau of Economic Research, 1968); G. Fels, "The Choice of Industry Mix in the

other hand, as yet unpublished preliminary calculations by Sanjaya Lall show that coefficients differ substantially among the United Kingdom, Brazil, and Singapore, although deficiencies in the measurement of capital- and skill-intensity remain a problem. Forewarned, we estimated the following cross-section regression equation to test whether exports to the south generate more jobs than exports to the north, etc., for each of the 10 exporters on the basis of factor data for corresponding U.S. industries:

$$\begin{aligned}\frac{X_{ik}^u}{\bar{X}_{ik}} &= \alpha + \beta_{1i}K_k + \beta_{2i}S_k + \beta_{3i}N_k + \beta_{4i}E_k + \mu_{ik}, \\ i &= 1, \dots, 10, \\ k &= 1, \dots, 93, \\ \bar{X} &= X_{ik}^u + X_{ik}^d.\end{aligned}\tag{1}$$

The quantity \bar{X} refers to the total exports of country i in product category k . X_{ik}^u and X_{ik}^d refer to country i 's exports in product category k to the south and north, respectively.⁷ The variable K measures the capital stock per worker; S measures the proportion of the labor force which is composed of technical, scientific, and professional workers; N measures natural resource intensity; and E measures scale economies.

An alternative measure of capital- and skill-intensity was also tried: nonwage value added per worker (profits) for capital-intensity, R ; and labor's share in value added per worker (the average wage) for skill-intensity, W . The Appendix summarizes all variables reported for equation (1) and additional variables introduced later.

The results of equation (1) are presented in table 2. In light of Diaz-Alejandro's expectations, the results are surprising. Although the share of commodities exported to LDCs and the degree of capital-intensity of these commodities, measured by either R or K , are, in general, positively correlated, in most equations the respective coefficients are not statistically significant. Thus, equal trade flows to the north and south do not contain significantly different capital requirements. Although this finding does not carry any necessary implication for employment (except in a two-

Division of Labour between Developed and Developing Countries," *Weltwirtschaftliches Archiv* 108, no. 1 (1972): 71-121.

⁷ The dependent variable in eq. (1) in the case of Brazil, e.g., is the percentage of Brazil's total manufactured exports in product category k destined to underdeveloped countries. A value of one indicates that Brazil exports zero to developed countries, and a value of zero indicates that all of Brazil's exports in product category k are sent to developed countries. The data covered a total of 93 possible manufactured goods measured at the SITC three-digit level. Only product categories in which either X_{ik}^u or X_{ik}^d equaled at least \$100,000 appeared as observations. Thus, Brazil exported at least \$100,000 to either developed or underdeveloped countries in as many as 86 product categories, while Pakistan's total number of observations equaled only 53. Manufactures are defined as SITC 5, 6 (excluding 68), 7, and 8, but eq. (1) was also run with an additional 13 possible manufactures of processed foods, beverages, and tobacco. The regression results with these products included are not reported but were virtually identical.

TABLE 2
EQUATION (1) ESTIMATES, LINEAR FORM OLS

EXPORTING COUNTRY	VARIABLES (A)					VARIABLES (B)								
	R	W	E	N	a	R ²	F-Stat.	K	S	E	N	a	R ²	F-Stat.
Argentina . . . .	.00022 (.091)	-.088 (3.23)**	-.035 (-.064)	-.321 (-1.26)	.188	.154	(4.73)	.278 (.853)	2.53 (3.53)**	-.169 (-.336)	-.290 (-1.08)	.461	.191	(4.73)
Brazil . . . . .	.0023 (.953)	.072 (2.73)**	-.531 (-1.03)	-.112 (-.430)	.102	.115	(4.82)	-.152 (-.472)	2.90 (4.19)**	-.476 (-1.01)	.089 (.334)	.309	.182	(4.82)
Colombia . . . .	.0030 (1.16)	.086 (3.26)**	.460 (.744)	-.074 (-.288)	.181	.192	(4.73)	.238 (.728)	2.39 (3.19)**	.549 (.954)	-.014 (-.052)	.490	.186	(4.73)
Mexico . . . . .	.0051 (1.44)	.0051 (1.95)*	-.501 (-.79)	-.470 (-1.79)	.097	.101	(4.79)	.301 (.951)	2.60 (3.72)**	-.324 (-.585)	-.323 (-1.22)	.120	.201	(4.79)
Hong Kong . . .	.0049 (1.69)	.083 (2.50)*	-.114 (-.177)	.523 (1.90)	-.102	.228	(4.63)	1.80 (3.01)**	.548 (.624)	-.174 (-.197)*	.029 (.084)	.289	.245	(4.63)
Rep. of Korea	.0029 (1.11)	.069 (3.20)**	-.504 (-.953)	.355 (1.73)	-.233	.189	(4.79)	.493 (1.79)	1.27 (2.10)*	-.291 (-.546)	.301 (1.33)	.067	.139	(4.79)
Singapore . . . .	.0017 (.787)	.031 (1.38)	-.603 (-1.16)	.052 (.242)	.601	.043	(4.81)	.293 (1.05)	-.180 (-.296)	-.355 (-.727)	-.021 (.091)	.788	.020	(4.81)
India	-.0023 (-.990)	.081 (3.26)**	.037 (.075)	.200 (.811)	.155	.123	(4.78)	.168 (.532)	1.91 (2.67)**	-.226 (-.481)	.131 (.499)	.441	.101	(4.78)
Pakistan . . . . .	.0071 (1.96)*	.086 (2.27)*	-.102 (-1.58)	.0001 (.0005)	.227	.221	(4.48)	.499 (1.17)	2.12 (2.22)	-.810 (-1.26)	.062 (.195)	.561	.171	(4.48)
Thailand . . . . .	.0062 (1.52)	.127 (3.55)**	.178 (.189)	.298 (.997)	-.311	.290	(4.51)	1.94 (3.07)**	.191 (.179)	.943 (1.06)	-.111 (-.309)	.304	.231	(4.51)
							5.22							3.83

NOTE.—Regression coefficients (*t*-statistics in parentheses). Dependent variable = X_{it}^w/\bar{X}_{it} ; R = nonwage value added per worker; W = average wage; K = capital stock per worker, the reported coefficient of K raised to the minus five power; S = proportion of labor force which is technical, scientific, and professional employees; E = a measure of scale economies; N = a measure of natural resource intensity. For full definitions and sources of variables, see Appendix.

* Significant at the .05 level.

** Significant at the .01 level.

factor, labor and capital, world), it does lead one to suspect that equal trade flows to the north and south do not generate significantly different quantities of employment.⁸ Skill-intensity, by contrast, measured by either W or S , is both positive and highly significant for most exporters.⁹ With respect to other industry characteristics, what is common to most exporters in the case of raw-material content is the nonstatistical significance of this variable and the erratic sign which N takes across countries (there is no a priori reason to expect the coefficient of N to be positive or negative). The variable measuring scale economies, E , was also not statistically significant, although negative in sign (one would have expected it to have been positive, given the commodity composition of south-south trade, to be discussed later). But the scale-economy variable, as constructed by Hufbauer, may have performed poorly because its conceptualization is quite problematic (Helleiner also found that E performed poorly).¹⁰ Overall, there were surprisingly few differences in the export behavior of the Asian and Latin American countries. One can see some signs of difference in the skill variables and, perversely, a little in the capital-intensity variables, but not much else.¹¹

A simple Heckscher-Ohlin (H-O) model with capital and unskilled labor as inputs would lead to the prediction that exporters in LDCs would

⁸ It is interesting that, when Diaz-Alejandro reran his equation for Colombia with data for 10 years and included not just a variable measuring capital-intensity but also a variable measuring import content, the coefficient of the former was almost never statistically significant (Diaz-Alejandro, *Foreign Trade Regimes and Economic Development*, pp. 72–73).

⁹ The exception is Singapore—and Argentina, in the case of W , the average wage. The findings for Singapore may derive from the fact that this economy has tried to encourage the export to all destinations of technology-intensive manufactures. As for Argentina, it might be the case that it has developed its skilled manpower and industrial base sufficiently to be able to compete in northern markets in skill-intensive products.

¹⁰ G. C. Hufbauer, "The Impact of National Characteristics and Technology on the Commodity Composition of Trade in Manufactured Goods," in *The Technology Factor in International Trade*, Universities–National Bureau Conference Series, no. 22, ed. Raymond Vernon (New York: Columbia University Press for the National Bureau for Economic Research, 1970); G. K. Helleiner, "Industry Characteristics and the Competitiveness of Manufactures from Less Developed Countries," *Weltwirtschaftliches Archiv* 112, no. 2 (1976): 507–24.

¹¹ It should be pointed out that the estimation of eq. (1) is based on export figures for only 1 year, 1973 (in the case of Singapore, 1972). The figures may be especially thin given that some countries (e.g., Thailand) began exporting manufactures to other LDCs only recently. Other exporters in the year in question may have been selling at prices below marginal cost. Nevertheless, for five out of 10 countries, eq. (1) was estimated for 1972 export data, and the results were almost identical. A log-linear rather than a linear specification also resulted in somewhat different findings for a few of the countries, depending on the measure of capital-intensity used, but for the most part, the picture portrayed above remained similar. Linear rather than log-linear regression results were reported because the former functional form appeared to give the "best" estimates. The findings reported for Thailand, Pakistan, and, to a lesser extent, Colombia, are least reliable, given inconsistencies in the findings for the two forms (depending on what measures of capital- and skill-intensity are used) and the relative newness of many commodities in the export bundles of these countries.

find the best markets for their more labor-intensive manufactures in highly industrialized economies where factor endowments differed sharply from their own, rather than in other LDCs. Since most of the 10 exporters studied were more industrialized than other LDCs, the H-O theory would also predict that more capital-intensive manufactures would be exported most intensively "downstream."

Not all "positive" theories of trade, however, would lead to these predictions (or to advice that the LDCs should act to make these predictions come true). The product-cycle hypothesis, for one, suggests that LDCs will export standardized commodities to the north. Some standardized commodities may be labor-intensive. Others, however, may lend themselves to simple assembly-line production techniques which are quite capital-intensive, although still requiring significant labor inputs. In Vernon's words: "The net effect of these specifications is indeterminate so far as capital-intensiveness is concerned. A standardized textile item may be more or less capital-intensive than a plant for unstandardized petrochemicals."¹² There is also the fact that foreign firms may locate in LDCs to produce not only the entirety of a labor-intensive commodity but also a labor-intensive component of a relatively capital-intensive product.¹³ The export of such finished products from LDCs to developed countries would weaken the positiveness of the capital-intensity coefficient.

Thus, the product-cycle hypothesis helps explain why export shares to the north seem not to be concentrated exclusively in labor-intensive commodities but, rather, in a broader range of commodity types which nonetheless utilize abundant amounts of cheap, unskilled labor.¹⁴ Never-

¹² Raymond Vernon, "International Investment and International Trade in the Product Cycle," *Quarterly Journal of Economics* 80 (May 1966): 190-207.

¹³ G. K. Helleiner, "Manufactured Exports from Less Developed Countries and Multinational Firms," *Economic Journal* 83 (March 1973): 21-47.

¹⁴ To pursue further the product-cycle hypothesis, two variables were used as surrogates for the degree of standardization of a good: the maturity of a product *FD*, measured by Hufbauer as the first date at which a commodity appeared as an export in U.S. trade statistics; and the degree of product differentiation of a commodity *PD*, measured by Hufbauer as the degree of dispersion of unit value in the relevant category in U.S. exports. The maturity of a product, however, is not a very good proxy for standardization. Some new products and some subprocesses in the production of either mature or new products may be quite standardized. Indeed, the coefficient of *FD* in a simple correlation was rarely statistically significant. Yet it was almost always positive (Singapore being the exceptional case), suggesting that LDCs may export more mature products to developed countries. Hufbauer's use of unit values to measure product differentiation has also come in for criticism (by Helleiner). Nevertheless, the coefficient of this variable in a simple correlation with export shares was almost always positive (and in five out of 10 cases, statistically significant), further suggesting that export shares to developed countries are relatively concentrated in less differentiated goods. An alternative way of capturing the degree of standardization of a commodity was tried. The assumption was made that commodities with high ratios of intra-industry trade are commodities with high degrees of product differentiation. Following Grubel and Lloyd, intra-industry trade, and hence product differentiation, was measured as:

$$[(X_i + M_i) - |X_i - M_i|] 100 / (X_i + M_i), \quad (2)$$

theless, one must look further for a clearer picture of why export shares to the south have the property of skill- rather than capital-intensity. The commodity composition of southbound exports, to which attention is now turned, adds depth to the picture.

III. The Commodity Composition of Exports to Underdeveloped Countries

Intra-Latin American trade in manufactures is believed to be concentrated in consumer durables, such as "... refrigerators, washing machines, and other 'middle class goods.' ..."¹⁵ Probably this belief is responsible for the expectation that intra-Latin American trade is relatively capital-intensive and the concern that it "... simply represent[s] an effort to recoup the losses arising from excessive import substitution of previous years, often at the expense of trade partners."¹⁶ Evidence presented below, however, casts doubt on this belief and also provides information on the character of the exports of the six non-Latin American countries which do not, in general, enjoy trade preferences with other LDCs. In the absence of trade preferences, the exports of the six are not likely to be concentrated in overpriced goods.

To learn more about the content of south-south trade, an attempt was made to discover any difference in the concentration of consumer versus producer goods in export shares to the north and south. The variable X_{ik}^u/\bar{X}_{ik} was correlated with Hufbauer's consumer-goods ratio, CC . In principle, this ratio measures "... the percentage of commodity output and imports purchased ... by 'final consumers' directly and on the 'second round.' ... The 'second round' refers to the percentage of intermediate goods which find their way to final consumption after one pass through the input-output table."¹⁷ A positive coefficient of CC would indicate that the higher the share of exports flowing to underdeveloped countries, the relatively more concentrated these exports are in commodities purchased by final consumers.

In all cases, the coefficient of CC was negative. In most cases, the

where X_i and M_i equal the exports and imports of country i ($i = 1, \dots, 10$). The coefficient of this measure of product differentiation, although rarely statistically significant, also turned out, in general, to be positive. Note also that if one assumes that the variable measuring scale economies, E , in eq. (1) is properly conceptualized, the fact that its sign was almost always negative may arise because standardized commodities typically have the property of economies of scale. G. K. Helleiner, "Industry Characteristics and the Competitiveness of Manufactures from Less Developed Countries"; Herbert G. Grubel and P. J. Lloyd, *Intra-Industry Trade: The Theory and Measurement of International Trade in Differentiated Products* (New York: John Wiley & Sons, 1975).

¹⁵ Albert Berry and Carlos F. Diaz-Alejandro, "The New Colombian Exports: Possible Effects on the Distribution of Income," mimeographed (New Haven, Conn.: Yale University, 1977), p. 8.

¹⁶ Diaz-Alejandro, "Some Characteristics of Recent Export Expansion in Latin America," pp. 222-23.

¹⁷ Hufbauer, p. 222.

statistical significance was high, indicating that producer goods are more likely to characterize the export bundle flowing to the south.

The dependent variable in the above regression, however, measures the numerical share, not the absolute value, of commodities exported to LDCs. A relatively large number of commodities flowing to LDCs may be producer goods, but a large value of the total may not be.¹⁸ To see whether this were so, the product distribution of exports to LDCs was calculated and appears in table 3.

Producer goods normally refer to intermediate inputs (such as steel, chemicals, and cement) and capital goods or engineering products (machinery and transport equipment [SITC 7]). Nevertheless, certain chemicals (e.g., pharmaceuticals and perfumes) and certain capital goods (e.g., household appliances and private automobiles) are purchased by final consumers. An attempt was made partially to correct for this so that only chemicals (SITC 5), iron and steel (SITC 67), and engineering products (SITC 7 exclusive of 725 and 732) are treated as producer goods. Table 3 then shows that the preponderance of manufactured exports to the south are not heavily weighted by consumer durables. Producer goods predominate (although roughly one-fifth of Argentina's southbound exports are accounted for by road motor vehicles).

Producer goods, however carefully defined, are very heterogeneous and include highly capital-intensive commodities. Some exports to the south are undoubtedly of this variety. Nevertheless, other producer goods are typically characterized by only a moderate degree of capital-intensity but a high degree of skill-intensity. That many producer goods exported to the south exhibit the latter property both accords with and suggests an explanation for the findings of equation (1).¹⁹

To summarize the argument thus far: the export by semi-industrialized countries of standardized commodities to the north weakens the labor-intensity of this trade flow, while exports—especially of capital goods—to the south strengthen the labor-intensity of these transactions. One could

¹⁸ The procedure of using the absolute value of the commodities exported to LDCs as the dependent variable is inadmissible. It may produce misleading results, as pointed out to me by Edward Leamer. Absolute values would have to be normalized by the total world output or exports of the good. Otherwise, a country may export large values of a commodity, not because the commodity is especially capital-intensive (or labor-intensive), but because it is produced (or exported) in vast quantities throughout the world.

¹⁹ The product distribution of exports to the north obviously differs from that reported in table 3. In general, chemicals, engineering products, iron and steel, and road motor vehicles loom much larger in exports to the south, whereas miscellaneous manufactures (SITC 8) are far more important in exports to the north. Nevertheless, in the cases of Singapore, South Korea, and Mexico—the last due to the presence of *maquiladoras* or export platforms on the U.S./Mexican border—the share of engineering exports (largely electronic equipment) to developed countries exceeds that to LDCs. Not surprisingly, in the regressions of export shares on the consumer/producer goods ratio *CC*, it was these three countries which were the exceptions to the rule of a highly significant statistical relationship.

TABLE 3
PRODUCT DISTRIBUTION OF MANUFACTURED EXPORTS OF TEN LDCs TO DEVELOPING COUNTRIES, 1973 (%)

SITC	Argentina	Brazil	Colombia	Mexico	Hong Kong	Republic of Korea	Singapore*	India	Pakistan	Thailand
Chemicals (5).....	12.0	9.0	22.8	36.3	4.5	5.1	14.3	6.8	†	4.5
Basic manufactures (6)	28.7	34.9	45.6	17.5	34.4	68.9	29.7	63.7	92.1	87.6
Machines, transport eq. (7).....	50.4	42.8	13.3	31.1	16.6	13.8	42.9	21.5	†	3.5
Miscellaneous mfg. (8).....	8.9	13.3	18.3	15.1	44.4	12.2	13.1	8.0	4.5	4.3
Total.....	100	100	100	100	99.9	100	100	100	96.6	99.9
Textiles (65).....	†	11.3	9.3	4.1	25.6	37.9	13.4	38.7	85.2	44.2
Clothing (84).....	†	7.4	7.2	†	17.5	7.4	†	†	†	†
Misc. light. mfg. (83, 862, 863, 89)...	7.0	4.6	7.5	14.3	17.1	†	6.3	4.6	†	†
Domestic electrical eq. (725).....	†	†	†	†	†	†	†	†	†	†
Road motor vehicles (732).....	19.8	11.7	†	6.7	†	†	9.5	4.1	†	†
Iron and steel (67)....	16.1	10.4	6.6	3.6	†	18.3	3.8	7.2	†	6.8
Engineering products (7-725 + 732) + (69, 81, and 861)....	34.5	34.2	19.1	29.6	24.9	16.0	39.2	22.1	†	6.3

SOURCE.—Exports compiled from United Nations, *Commodity Trade Statistics*, Series D (New York: United Nations, various issues).

* 1972.

† Less than 3%.

infer from this that in still less industrialized countries, where the production of neither capital goods nor standardized commodities has yet commenced, exports to southern markets are relatively capital-intensive. Indeed, there is some evidence to bear out such a hypothesis. In a study directed by Anne Krueger and sponsored by the National Bureau of Economic Research and AID, it was found that, in three out of four countries (Chile, Kenya, and Uruguay; the exception was Thailand), exports to LDCs in the late 1960s or early 1970s were far less labor-intensive than exports to other destinations. From this Krueger concludes: "... the prospects for trade among LDCs are indeed limited, as customs union theory forecasts. In fact, the large disparity in factor proportions between the various destinations strongly suggests that it is the high-cost import substitution industries which find their only export outlet in other developing countries."²⁰

To suggest that it is high-cost import-substitution industries which dominate intra-LDC trade implies that common markets or other preferential agreements bind LDC trading partners. In fact, Chile, Kenya, and Uruguay were parties to such agreements in the period in question. Barter agreements for primary products in exchange for manufactures between LDCs not parties to preferential agreements may also allow high-cost import-substitution industries to dispose of their surpluses in foreign markets and may also have contributed to Krueger's results.

Several points, however, may be raised in connection with Krueger's country studies and the generality of her conclusions, with respect to exports from both relatively industrialized and unindustrialized LDCs. First, in the case of Chile, only seven products (at the SITC four-digit level, almost all of them based on natural resources) exhausted the *manufactures* to the north and south for which factor proportions were calculated and for which conclusions were drawn about compositional differences in Chile's trade flows.²¹ Second, by no means all trade in manufactures among LDCs is subject to preferential regulation, so it is unwarranted to suppose that high-cost import-substitution commodities predominate. As of 1976, almost half of intra-LDC trade originated in East and South Asia, virtually none of it subject to preferential treatment. Even if all intraregional trade within sub-Saharan Africa, as well as within Latin America, were governed by preferential treatment, both intraregional flows accounted for no more than 20% of total south-south trade.²² Complementation agreements and especially the reduction of in-

²⁰ Krueger, p. 273.

²¹ Vittorio Corbo and Patricio Meller, "Sustitucion de importaciones, promocion de exportaciones y empleo: El caso Chileno," Corporacion de Investigaciones Economicas para Latinoamerica (CIEPLAN), no. 15 (Santiago de Chile: CIEPLAN, 1977), and "Trade and Employment: Chile in the 1960's," *American Economic Review* 69 (May 1979): 196-201.

²² United Nations, *Monthly Bulletin of Statistics*, vol. 32 (June 1978), special table F; UNCTAD, *Handbook of International Trade and Development Statistics, Supplement 1977* (New York: United Nations, 1978), annex A.

ternal tariffs subsequent to the formation of intraregional free-trade or common-market associations would also act as a stimulus to competition.²³ Third, in the absence of regional preferences, there is, of course, no theoretical presumption to the effect that exports from less industrialized LDCs to more industrialized LDCs, or even to LDCs at comparable levels of industrialization, are relatively capital-intensive. What types of commodities (apart from those based on natural resources) would one expect, say, Singapore to import from the Philippines? The Heckscher-Ohlin-Samuelson postulate predicts that more industrialized LDCs will export relatively capital-intensive goods to less industrialized ones, but certainly not the reverse; and the theory has little to say about trade between equally industrialized economies. In fact, there is some evidence on south-south trade for the very early 1970s which suggests that semi-industrialized LDCs do not find the best customers for their manufactures among the least industrialized Third World countries—the implication being that they find better customers among LDCs whose level of industrialization more closely approximates their own.²⁴ Fourth, nontariff barriers erected by developed countries against the labor-intensive exports of developing ones may serve to divert such exports to Third World markets. Thus, relatively labor-intensive, rather than high-cost import-substitution, industries may find an export outlet in other developing countries. This rerouting in the face of northern trade barriers may well have influenced the results reported for equation (1), although LDCs also erect nontariff barriers against one another's exports. Finally, licensing and patent agreements which prohibit exporting by Third World firms may serve to reduce the number of "sophisticated," high-technology products which find their way into any trade flow.²⁵

Geographical proximity and cultural ties are obvious reasons why LDCs may import some producer goods from other LDCs rather than from traditional suppliers in advanced countries. Other reasons follow.

First, the availability of cheap *skilled* labor may make certain exports of semi-industrialized LDCs highly competitive. Yet the global supply strategies of multinational firms, rather than price attractiveness, may also underlie south-south exchange. Some intra-LDC exports constitute the intrafirm sales of transnationals and others reflect the decision of transnationals to supply one LDC with output realized in another.

²³ The extent of competitiveness in intra-industry trade in the Latin American Free Trade Association and the Central American Common Market is discussed by Bela Balassa, "Intra-Industry Trade and the Integration of Developing Countries in the World Economy," World Bank Staff Working Paper no. 312 (Washington, D.C.: World Bank, 1979).

²⁴ Alice H. Amsden, "Trade in Manufactures between Developing Countries," *Economic Journal* 86 (December 1976): 778–90.

²⁵ E.g., Monti reports that in Argentina 85% of trademark licenses and 50% of patent licenses prohibit exporting. Angel Monti, "Las exportaciones manufactureras Argentinas," in *Políticas de promoción de exportaciones*, CEPAL-Naciones Unidas, vol. 1 (Santiago de Chile: CEPAL, 1977), p. 44.

Second, in the case of Latin America, tariffs (and nontariff barriers) on imports of capital goods from neighboring countries are lower than on comparable imports from more industrialized countries.²⁶ This would provide Latin America with an inducement to meet part of its need for capital equipment with imports from Argentina, Brazil, and Mexico rather than from elsewhere. Such imports, however, may not exhibit excessive trade diversion. Capital goods generally enjoy less protection than other commodities throughout Latin America. Thus, if some trade diversion characterizes the exchange of capital goods in the LAFTA area, it is probably far less significant than what is worrisome to Diaz-Alejandro in the case of consumer goods, whose levels of protection are much higher. The same may be true of India's exports of capital goods under bilateral trading arrangements.

Third, the importation of some capital goods from semi-industrialized economies may be unambiguously attractive to LDCs for the following reason. Some of these capital goods appear to be competitively priced as well as technologically unsophisticated ("appropriate" in the product and process senses, to use Stewart's terminology). Machine tools are a case in point. Exports of machine tools from Argentina and Brazil flow largely to other LDCs.²⁷ That such exports are technologically simple is confirmed by their lower unit value in comparison with the machine tool imports of these countries. That such exports are competitively priced is suggested by the relatively low firm-concentration ratio in the machine tool sector.²⁸ The Taiwanese machine tool industry also exported almost exclusively to other LDCs in the early 1970s.²⁹ The lower-quality standards attained by the industry (few foreign firms were involved) were adequate for the purposes of small-scale Asian machine tool users; and the price was right.

A detailed qualitative inventory of the capital goods exports of semi-industrialized countries would be necessary to ascertain the relative importance of commodities like machine tools in the total. That such com-

²⁶ NAFINSA (Nacional Financiera, S.A.)-CEPAL (Estudio Conjunto), "Condiciones de acceso de los bienes de capital al mercado de los países miembros de la ALALC," *El mercado de valores*, suppl. no. 37 (1975).

²⁷ NAFINSA, Mexico: *Una estrategia para desarrollar la industria de bienes de capital*, Proyectos Conjunto de Bienes de Capital (Mexico, D.F.: NAFINSA-ONUDI, 1977).

²⁸ See, e.g., Alice H. Amsden, "The Machine Tool Industry in Latin America," mimeographed (New York: Barnard College, 1979); and also, for Brazil, Instituto de Planejamento Economico e Social (IPEA), *A industria de maquinas-ferramenta no Brasil*, Serie Estudos para o Planejamento, no. 8 (Rio de Janeiro: IPEA, 1974); Regis Bonelli and Luiz Otavio Facanha, "The Capital Goods Sector in Brazil: Development, Problems and Perspectives," mimeographed (Rio de Janeiro: Financiadora de Estudos e Projetos [FINEP], 1977); F. R. Versiani and V. L. Bastos, "The Brazilian Machine Tool Industry: Patterns of Technological Transfer and the Role of the Government," mimeographed (Rio de Janeiro: FINEP, 1976).

²⁹ Alice H. Amsden, "The Division of Labour Is Limited by the Type of Market: The Case of the Taiwanese Machine Tool Industry," *World Development* 5 (March 1977): 217-33.

modities appear at all in the total, however, may be attributed to the survival of local capital. The transnationals may not be hegemonic in engineering subsectors like machine tools for good reason. Given ease of entry and greater competition, many subsectors of capital goods appear to earn relatively low rates of return. There is thus room in a world dominated by transnational oligopolies for small local firms (although foreign capital has begun to fill certain niches in the Brazilian machine tool industry).

Finally, an increase in what has been termed “technological exports” (e.g., turnkey projects) promises to reinforce the relatively low capital-intensity of southbound trade from the semi-industrialized countries. The main exporters of complete plants are now India, Argentina, Brazil, Mexico, the Republic of Korea, and Taiwan.³⁰ According to Lall, the export of turnkey projects represents the next logical step from the export of capital equipment. Since the production of capital equipment in many semi-industrialized countries is believed to be skill- rather than capital-intensive, exports of turnkey projects mirror this. The basis of comparative advantage in technological exports by semi-industrialized countries is the low cost of skilled workers and the suitability of such technology for LDC buyers.

It is worth noting that in the case of Argentina—the Latin American exporter of turnkey projects about which most is known—such trade remains almost exclusively in local hands. The state plays a significant role in turnkey exports from India, while local capital predominates in all types of manufactured exports from Taiwan and Korea.³¹ The control exerted by local capital over technology exports from Argentina, however, is the exception to the rule; and what Diaz-Alejandro finds distressing about intra-Latin American trade in manufactures is the high degree to which such trade is concentrated in the hands of a few foreign firms.³²

³⁰ See Sanjaya Lall, “Developing Countries as Exporters of Industrial Technology,” in Giersch, ed. (see n. 2 above); Jorge Katz and Eduardo Albin, “Technology and Industrial Exports: A Micro-Economic Analysis of Argentina’s Recent Experience,” Inter-American Development Bank/United Nations Economic Commission for Latin America, Research Programme in Science and Technology, Working Paper no. 2 (Buenos Aires: U.N. Economic Commission for Latin America and Inter-American Development Bank, 1978); Carlos F. Diaz-Alejandro, “Foreign Direct Investment by Latin Americans,” in *Multinationals from Small Countries*, ed. T. Agmon and C. P. Kindleberger (Cambridge, Mass.: MIT Press, 1977); Yung W. Rhee and Larry E. Westphal, “A Note on Exports of Technology from the Republics of China and Korea,” Inter-American Development Bank/United Nations Economic Commission for Latin America, Research Programme in Science and Technology (Buenos Aires: U.N. Economic Commission for Latin America and Inter-American Development Bank, 1978).

³¹ For Taiwan and Korea, see Rhee and Westphal; and Larry E. Westphal, “The Republic of Korea’s Experience with Industrial Development,” *World Development* 6 (March 1978): 347–82.

³² Juan Carlos Casas, “Las multinacionales y el comercio latinoamericano,” Centro de Estudios Monetarios de Latina America (CEMLA), *Boletín mensual* 18 (December 1972): 14–22, as cited by Diaz-Alejandro, “Some Characteristics of Recent Export Expansion in Latin America,” p. 231.

Nevertheless, the assignment of low marks to southbound exports from the Latin American countries on the basis of foreign ownership must await data (which appear to be unavailable) on the percentage of northbound exports accounted for by the transnationals. It may, of course, transpire that a reduction of trade barriers hindering manufactured exports to the north from LDCs may be accomplished only under pressure from the transnationals, which stand to benefit from producing in cheap-labor regions and reexporting to high-cost ones. Northbound exports may thus become as foreign firm-intensive as some regional southbound exports now appear to be.

IV. Conclusions

In light of doubts expressed in the literature about the economic benefits of intra-Third World trade in manufactures, the foregoing compared some industry characteristics of manufactures exported by 10 semi-industrialized LDCs to the north and south. Attention focused on the employment generated by the two flows and a negative picture of intra-LDC trade was found to be unjustified: differences in capital-intensity of exports to the advanced capitalist countries and other LDCs were not found to be statistically significant.

However, LDC-manufactured exports to other LDCs are only a third of what they are to the rest of the world (see table 1). Thus the disappointing conclusions of research on the impact on employment of exports to developed countries hold a fortiori in the case of the smaller trade in manufactures among LDCs. After reviewing such research, Helleiner contends that there is no short-run poverty-alleviating or distributional magic in manufacturing for export.³³ Although eight semi-industrialized countries increased their exports of manufactures to other LDCs by over 60% between 1973 and 1975, and exports of "nontraditional" manufactures to the world have in general grown rapidly, these exports typically represent a relatively small percentage of total GDP.³⁴ They would have to grow at unprecedentedly fast rates to absorb both the stock of unemployed and the flow of new job seekers. Open unemployment, therefore, cannot be expected to disappear by the sleight of hand of an export-oriented development strategy, whatever the direction of trade, even in the limited number of LDCs where this trade has become a reality.

In any event, it may be unduly shortsighted to assess trade flows to different destinations by the criterion of what immediate impact each makes on employment. Given at present quite striking differences in the

³³ G. K. Helleiner, "Transnational Enterprises, Manufactured Exports and Employment in Less Developed Countries," in *Background Papers, World Employment Conference* (Geneva: International Labour Organisation, 1976).

³⁴ UNCTAD, "Recent Trends and Developments in Trade in Manufactures and Semi-Manufactures" (see n. 3 above), and *Handbook of International Trade and Development Statistics* (see n. 22 above).

commodity composition of the two flows, quite striking differences in the bearing each has on development may be expected—according to broad-ranging criteria which are dynamic as well as static, social as well as economic. Balassa's review of the experience of the Latin American Free Trade Association and the Central American Common Market with intra-industry trade renders a rather positive picture of its welfare effects in terms of specialization, the realization of scale economies, "X-efficiency," and "learning-by-doing."³⁵ One would also like to explore more systematically the relationship between capital accumulation based on successfully competing in the world economy and skill-intensive exports.

To round out the picture, one would like to learn more about the effects of south-south trade on those LDCs which provide the markets for the exports of semi-industrialized countries: have such imports been industry creating or industry diverting? Has the emergence of new suppliers affected prices advantageously? Will intraregional exchanges, especially of intermediate inputs—many of them very capital-intensive—grow in conjunction with trade liberalization, or with increases in what frequently are already relatively high levels of protection?

To capture all the important differences in the bundle of exports destined to the north and the south may, moreover, require devising for each something akin to a morphology or political economy. Statistical approaches, regardless of how thorough, may alone be inadequate. Take, for example, any differences in import intensity which may or may not arise. If south-south trade is found to be more import-intensive than north-south trade, this negative effect on the balance of payments in a comparison of the two flows would need to be given due weight. But if imports of foreign-produced machinery and know-how do not involve over-capitalization but, rather, involve increases in the quality and reductions in the costs of locally produced goods, this, too, would need to be weighted. Whatever the outcome, to trace the logic of the argument would necessitate a qualitative understanding of the structures of production which underlie the patterns of foreign exchange.

Finally, any realistic assessment of the two flows would require a sensitivity to future supply-price effects. Exports to the north are largely concentrated in clothing and electronics, while exports to the south involve a wide range of commodities which individually account for only a small share of any market. Under these conditions, as LDCs increase their exports, is it valid to make the "small country" terms of trade assumption for south-south trade but to anticipate a deterioration in terms of trade with the north, especially if restrictions on imports imposed in the north are not relaxed?

³⁵ See Balassa (n. 23 above). To use the machine tool example once again to illustrate the importance of learning by doing, the experience which Taiwanese machine tool builders acquired in exporting to Asia eventually allowed them to penetrate the much larger American and Australian markets for standardized models.

The buildup of a producer goods capacity has been identified historically as basic to the process of economic development. In the context of Soviet industrialization, it was seen as a means to increase the investment coefficient and the rate of growth. Recently, the creation of a machinery sector has been viewed as a necessary condition for the indigenous generation of "appropriate" technology.³⁶ The importance of capital goods exports to the Asian periphery in the economic history of Japan has also been recognized. Nevertheless, while historical examples cannot be ignored, neither can it be assumed that history will repeat itself, or that the buildup of a producer goods capacity will quickly transform poor countries into rich ones. Such a buildup, depending on how it is financed, may involve a sharp increase in foreign indebtedness or heavier taxation of the poor. The burden of development borne by this generation of workers may be no lighter if skill-intensive rather than labor-intensive commodities are encouraged—no matter whether such commodities are exported to the south or eventually to the north. Unless the oligopolistic structure of many final product markets is changed, productivity advances in the manufacture of producer goods may not materialize as lower prices for final consumers. Nor is it necessarily the case that *exports* of producer goods will always aid the buildup of capacity. Exports of commodities for which the domestic market is saturated may reflect the postponement of technological upgrading. Yet, whatever the outcome of broad considerations such as these, they are as germane to any assessment of trade as considerations of employment and economic efficiency, narrowly defined. For the private and social ramifications are inevitably complex in comparisons of a growth strategy which places more (less) emphasis on the expansion of capital and intermediate goods than on increased production of exportables which require minimal inputs of skilled labor.

Appendix

Definition of Variables

W = average wage;

S = percentage of total employees accounted for by professional, technical, and scientific personnel in U.S. industry;

R = nonwage value added per employee;

K = capital stock per employee;

E = exponent in the regression equation, $v = kn^E$, where v is the ratio of value added per employee in plants employing n persons and average value added per employee for the industry, and k is a constant;

N = renewable plus nonrenewable resource product requirements per dollar of final output;

FD = year in which product first appeared in U.S. export statistics;

³⁶ Frances Stewart, "Capital Goods in Developing Countries," in *Employment, Income Distribution and Development Strategy*, ed. Alec Cairncross and Mohinder Puri (New York: Holmes & Meier, 1976).

PD = coefficient of variation in unit values of U.S. exports to different countries;
 CC = consumer/producer goods ratio.

The above variables were utilized by Helleiner, "Industry Characteristics and the Competitiveness of Manufactures from Less Developed Countries." The variables S , K , E , FD , PD , and CC are based on the compilations of Hufbauer. The variable N is based on the work of Jaroslav Vanek, *The Natural Resource Content of United States Foreign Trade, 1870–1955* (Cambridge, Mass.: Harvard University Press, 1963), table 7.2. The variables W and R are based on data from U.S. Bureau of the Census, *Census of Manufactures*, vol. 1 (Washington, D.C.: Government Printing Office, 1967). Export data for equation (1) are from United Nations, *Commodity Trade Statistics*, Series D (New York: United Nations, various issues).